Costs of Measuring Soil Carbon

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Siân Mooney, Ph.D.
Department of Agricultural and Applied Economics
University of Wyoming

Collaborators

John M.Antle (Montana State University)

Susan M. Capalbo (Montana State University)

Keith Paustian (Colorado State University)

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Outline

- Role of Contract Design
- How Measure Soil C?
- Factors Affecting Measurement Costs
  - Project Size
  - Acceptable Error
  - Confidence Level
  - Time period/frequency of measurement
  - C Variability
- Measurement costs as percentage of total project costs

Measurement Costs and Overall Contract Costs

Total Cost of Purchasing Credits
(Price * Number of Credits)
+
Total Cost of Measurement/Monitoring
+
Other

Total Contract Costs

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Center for Agricultural and Rangeland Soil Sequestration of Greenhouse Gases
www.casmgs.colostate.edu

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Role of Contract Design

Cost category	Per-credit contract	Per-hectare contract
Legal - drawing up contracts - negotiating with producers	X	X
Aggregation - aggregating individual producers into larger contract groups	X	X
Monitoring - verifying producers have made a change in land use	X	X
Measuring - estimating the number of C credits sequestered over the contract period	**X**	**Unnecessary**

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Measurement - General

- Predictive biophysical models – estimate ΔC
- Measure baseline – statistical sampling/field samples/lab testing
- Measure C periodically over duration of contract
- Measure C at end of contract

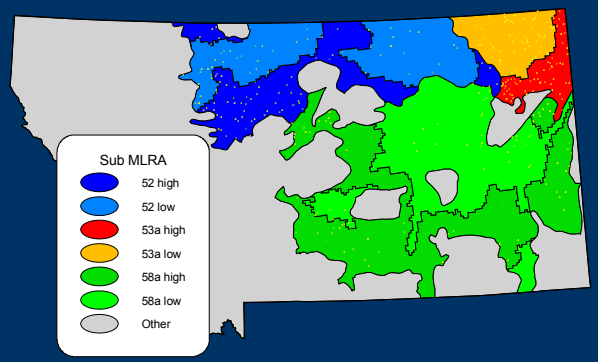
Model structure

Econometric Models
(output supply, input demand)

Century Ecosystem Model
(NREL)

parameter estimates

carbon estimates



Land use simulation
-stochastic output and input prices
-policy designs and payment levels

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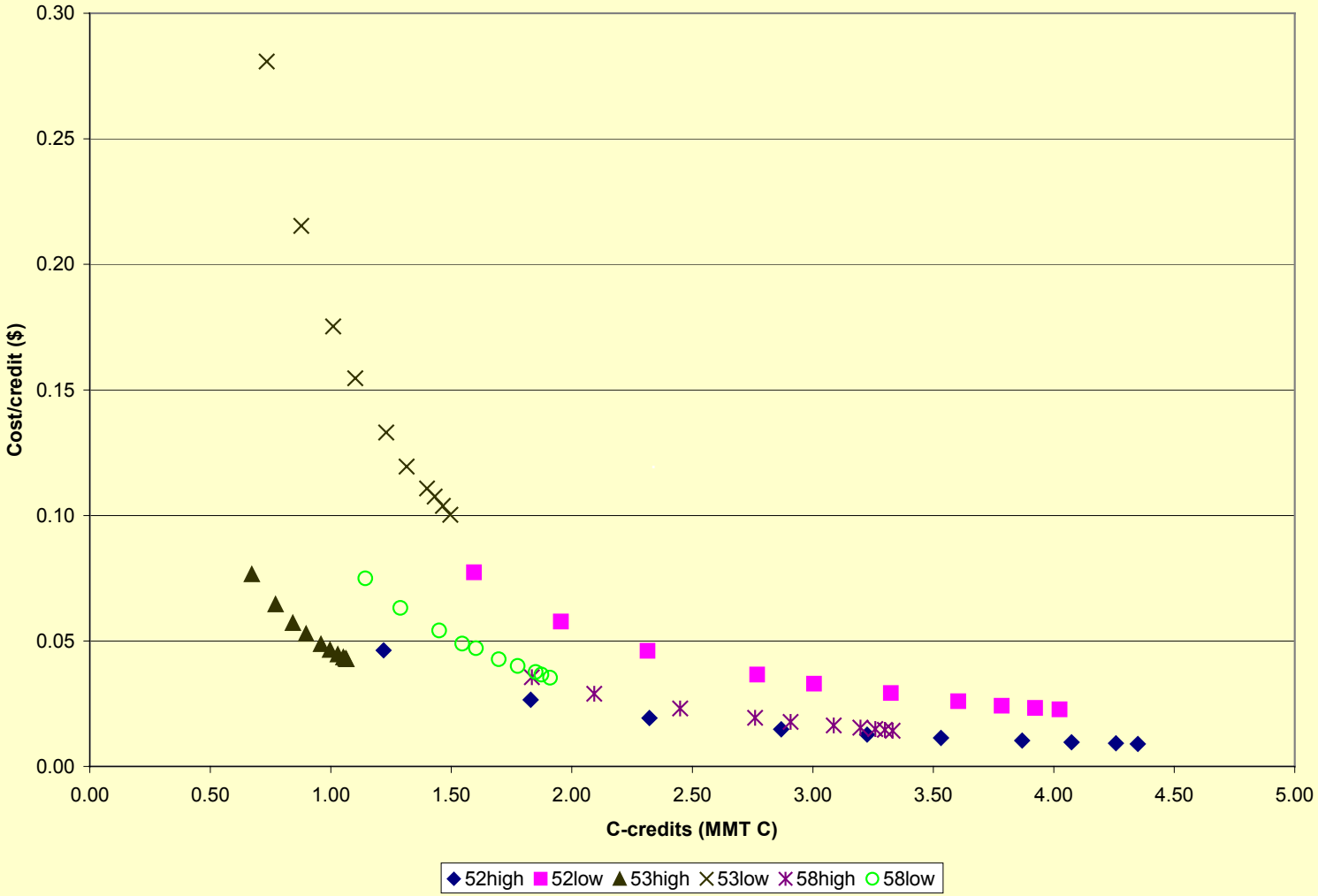
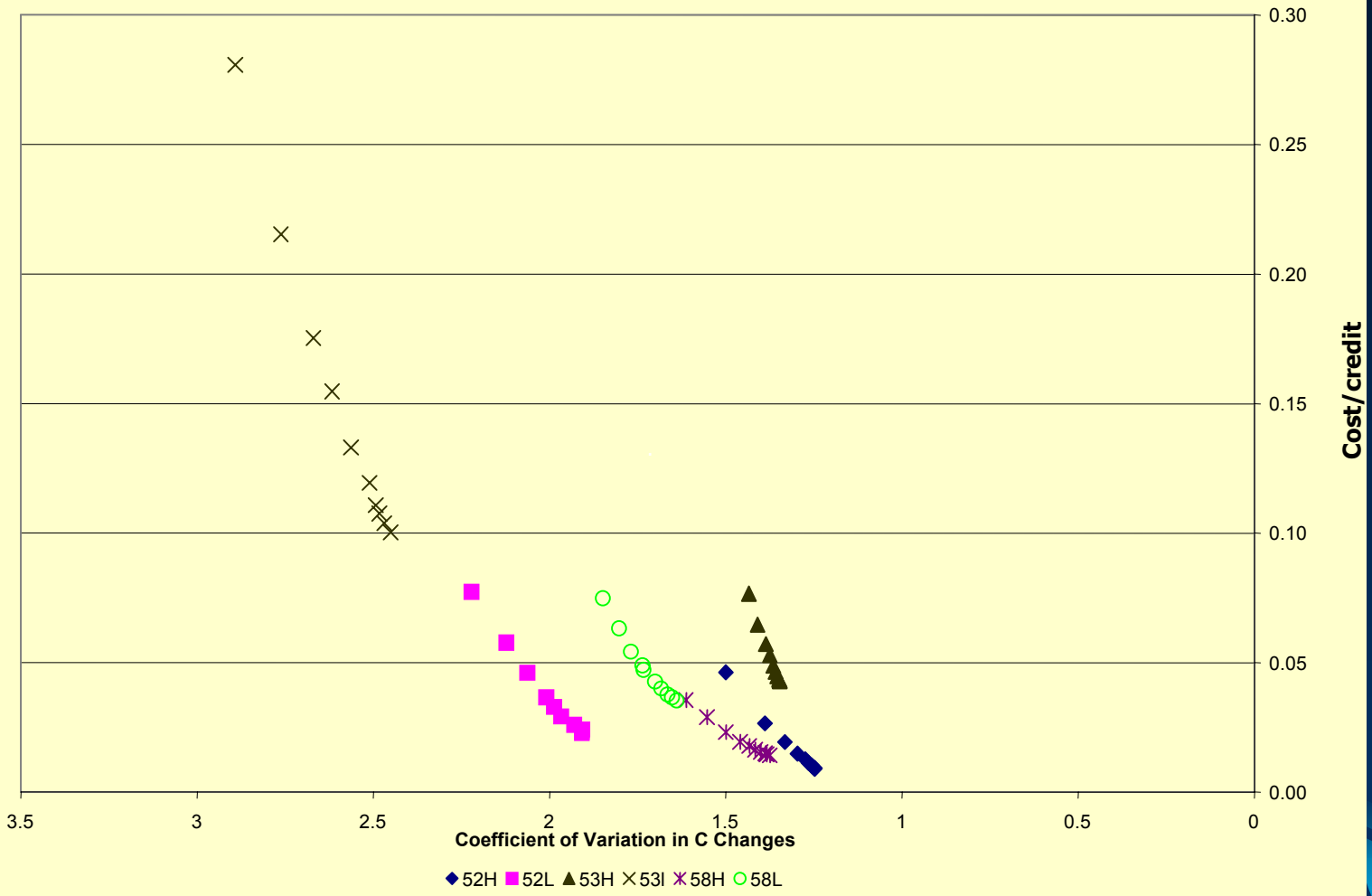
Project Size



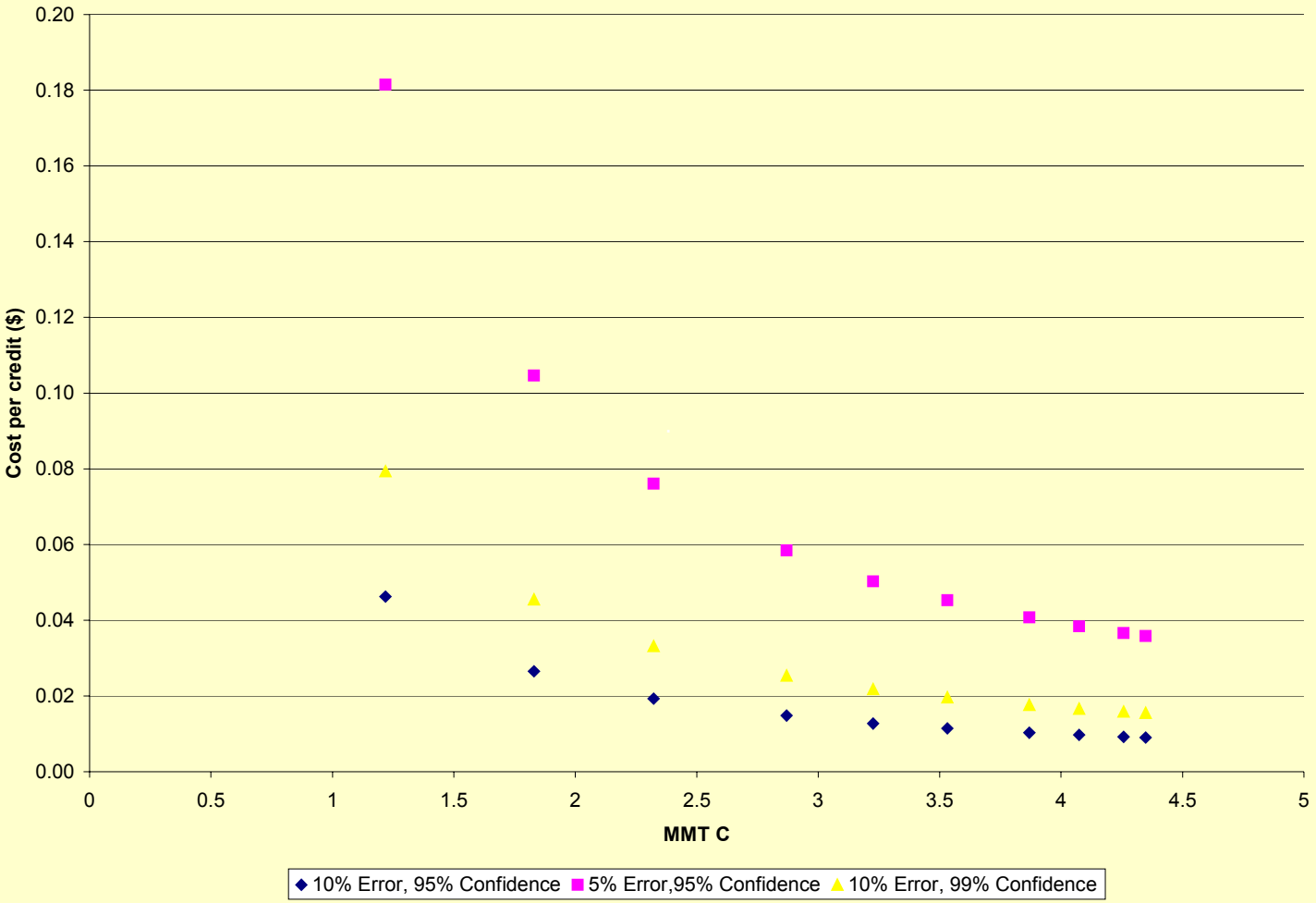
Source: Mooney, S., J. M. Antle, S. M. Capalbo and K. Paustian. Design and Costs of a Measurement Protocol for Trades in Soil Carbon Credits. working Paper, Department of Agricultural and Applied Economics, University of Wyoming.

Carbon Variability



Source: Mooney, S., J. M. Antle, S. M. Capalbo and K. Paustian. 2004. Influence of Project Scale on the Costs of Measuring Soil C Sequestration. *Environmental Management*. In Press.

Error and Confidence Interval



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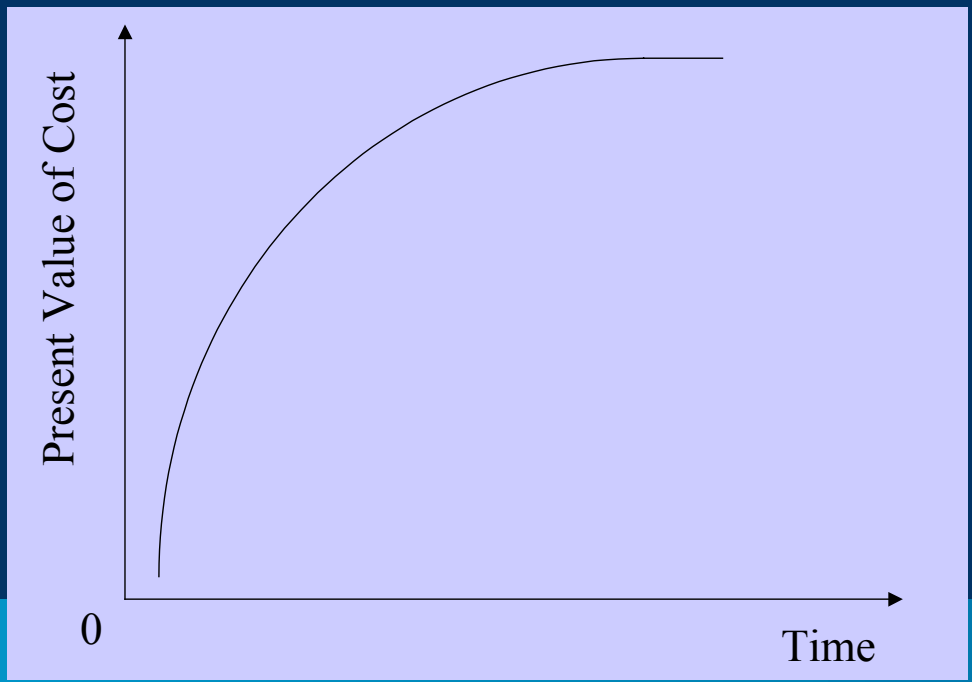
Duration of Project

- Costs increase at a decreasing rate as you increase the duration of a project
- Costs level off faster for small projects



Measurement as Percent of Total Contract Cost

- High credit price

  - want to spend more on measurement to ensure that all credits are counted

- Low credit price

  - implement a measurement scheme with larger error (less expensive)

Summary

- Costs affected by many factors
- Need to be aware of how these factors affect costs when purchasing credits
- Costs increase with:
  - Increasing cost per sample, frequency of sampling, carbon variability, confidence level
  - Decreasing project size, acceptable level of error

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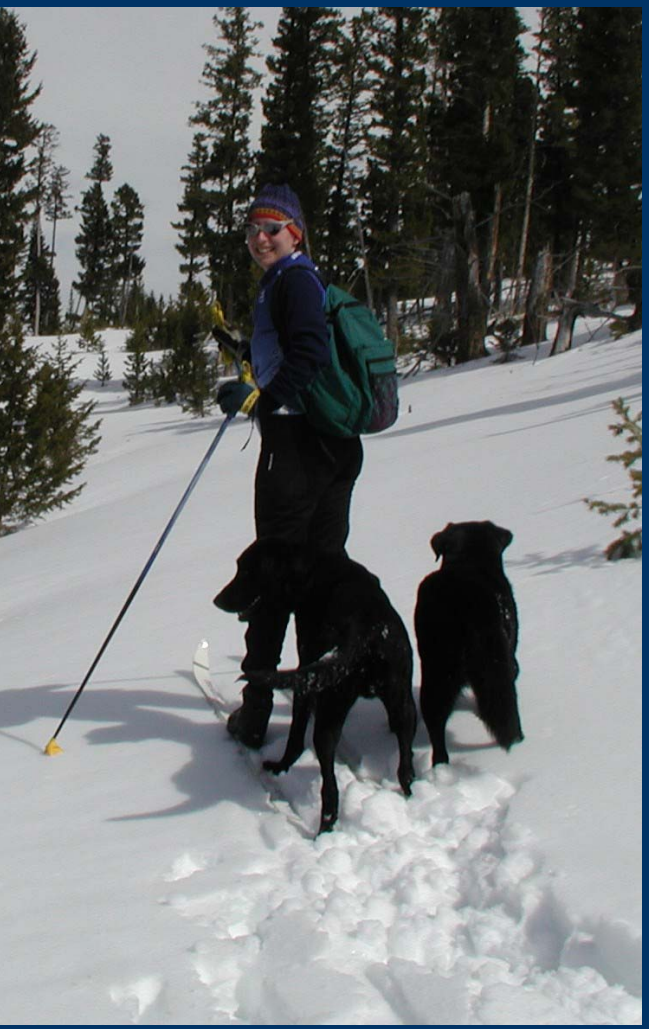
For More Information



Siân Mooney
Department of Agricultural
and Applied Economics
University of Wyoming
Laramie, 82071

E-mail : smooney@uwyo.edu

Web: http://agecon.uwyo.edu

Phone: (307)-766-2389

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